

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior listings of claims in the application.

Listing Of Claims:

Claim 1 (currently amended): [[A]] An integral, substantially air impermeable
polymeric membrane for use in an electrochemical apparatus or process comprising:
a) a polymeric sheet comprising polymer and having a porous structure with a
microstructure of fibrils,
b) the polymeric sheet having distributed in the polymer:
 i) inorganic particulate;
 ii) metal;
 iii) an organic polymer; or
 iv) a combination thereof, and
c) said porous structure being at least partially filled with an ion-exchange resin to
provide ionic conductance for use in the electrochemical apparatus or process.

Claim 2 (original): The membrane of claim 1 wherein the polymeric sheet has
distributed therein an inorganic finely divided powder.

Claim 3 (original): The membrane of claim 1 wherein the polymeric sheet has
distributed therein a precious metal.

Claim 4 (original): The membrane of claim 1 wherein the polymeric sheet has
distributed therein silica.

Claim 5 (original): The membrane of claim 1 wherein the polymeric sheet has distributed therein fumed silica.

Claim 6 (original): The membrane of claim 1 wherein the polymeric sheet has distributed therein titania.

Claim 7 (original): The membrane of claim 1 wherein the polymeric sheet has distributed therein carbon.

Claim 8 (original): The membrane of claim 1 wherein the polymeric sheet has distributed therein platinum.

Claim 9 (original): The membrane of claim 1 wherein the polymeric sheet has distributed therein platinum supported on a substrate.

Claim 10 (currently amended): The membrane of claim 1 A polymeric membrane for use in an electrochemical apparatus or process comprising:

- a) a polymeric sheet comprising polymer and having a porous structure,
- b) the polymeric sheet having distributed in the polymer:
 - i) inorganic particulate;
 - ii) metal;
 - iii) an organic polymer; or
 - iv) a combination thereof, and

c) said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process,

wherein the polymeric sheet is expanded porous PTFE, and said ion-exchange resin fills substantially all pores of the expanded porous PTFE.

Claim 11 (original): The membrane of claim 1, wherein the polymeric sheet has inorganic particulate distributed therein.

Claim 12 (original): The membrane of claim 1, wherein the polymeric sheet has metal distributed therein.

Claim 13 (original): The membrane of claim 1, wherein the polymeric sheet has an organic polymer distributed therein.

Claim 14 (original): The membrane of claim 1, wherein the polymeric sheet has a thickness of less than 50 microns.

Claim 15 (original): The membrane of claim 1, wherein the membrane is disposed between two fuel cell electrodes.

Claim 16 (canceled).

Claim 17 (previously presented): The membrane of claim 15, wherein the polymeric sheet has a thickness of less than 38 microns, and wherein the membrane that is disposed between said two electrodes of a fuel cell provides a steady state current of at

least 1.78 amps/cm² at 0.5 volts, with no humidification of incoming fuel cell air and hydrogen reactants, with air and hydrogen feed both at 40 psig and 25°C, and the fuel cell temperature at 50°C.

Claim 18 (currently amended): A composite membrane for use in an electrochemical apparatus or process comprising:

- a) a polymeric sheet comprising polymer and having a porous structure and a thickness of less than 50 microns,
- b) said polymeric sheet having distributed in the polymer inorganic particulate, metal, or a combination thereof;
- c) said porous structure being ~~at least partially~~ substantially filled with a polymeric gel that contains electrolyte to provide ionic conductance for use in the electrochemical apparatus or process.

Claim 19 (cancelled).

Claim 20 (currently amended): [[A]] An integral, substantially air impermeable composite membrane for use in an electrochemical apparatus or process comprising:

- a) a polymeric sheet comprising polymer and having a porous structure with a microstructure of fibrils,
- b) said polymeric sheet having distributed in the polymer inorganic particulate, metal, or a combination thereof,

c) said porous structure being at least partially filled with a polymer composition that contains metal salts to provide ionic conductance for use in the electrochemical apparatus or process.

Claim 21 (previously presented). The composite membrane of claim 18, wherein said porous structure is substantially filled with the polymer composition that contains metal salts.

Claim 22 (previously presented): The composite membrane of claim 20, wherein said polymeric sheet has a thickness less than 50 microns.

Claim 23 (previously presented): The composite membrane of claim 22, wherein said polymeric sheet has a porosity of 40% to 95%.

Claim 24 (previously presented): The membrane of claim 1, wherein said ion-exchange resin is fluorinated.

Claim 25 (previously presented): The membrane of claim 14, wherein the polymeric sheet has a thickness between 13 microns and 50 microns.

Claim 26 (previously presented): The composite membrane of claim 18, wherein the polymeric gel comprises a polymer with a cross-linked structure.